



**SLOVENSKI STANDARD**  
**oSIST prEN 12966:2013**  
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**Pokončni cestni znaki - Prometni znaki s spremenljivim sporočilom**

Road vertical signs - Variable message traffic signs

Vertikale Verkehrszeichen - Wechselverkehrszeichen

Signaux de signalisation routière verticale - Panneaux à messages variables

**Ta slovenski standard je istoveten z: prEN 12966**

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93.080.30	Cestna oprema in pomožne naprave	Road equipment and installations
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NORME EUROPÉENNE  
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**prEN 12966**

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English Version

## Road vertical signs - Variable message traffic signs

Signaux de signalisation routière verticale - Panneaux à messages variables

Vertikale Verkehrszeichen - Wechselverkehrszeichen

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 226.

If this draft becomes a European Standard, CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

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EUROPEAN COMMITTEE FOR STANDARDIZATION  
COMITÉ EUROPÉEN DE NORMALISATION  
EUROPÄISCHES KOMITEE FÜR NORMUNG

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## Foreword

This document (prEN 12966:2013) has been prepared by Technical Committee CEN/TC 226 "Road equipment", the secretariat of which is held by AFNOR.

This document is currently submitted to the CEN Enquiry.

EN 12966, with the introductory element and the main element of the title "*Road vertical sign – Variable message traffic signs*", covers the product standard, evaluation of conformity including type testing and factory production control.

It derives from performance requirements and test methods published in CEN, CENELEC, CIE and ISO documents together with standards of the CEN member organisations.

This document will supersede EN 12966-1:2005+A1:2009, EN 12966-2:2005, EN 12966-3:2005.

The main changes with respect to the previous edition are listed below:

- visual performance requirements of continuous VMS (Clause 6) and discontinuous VMS (Clause 7), have been updated, test methods have been simplified (9.5);
- physical performance requirements have been updated (Clause 8), test method have been adjusted accordingly (9.4);
- Parts 2 and 3 of EN 12966 have been integrated in the main body of the document, combined in Clause 11 Evaluation of conformity (11.2 Type testing and 11.3 Factory production control);
- informative Annex C and Annex D have been reviewed, information and guidance has been added for better understanding;
- informative Annex H has been added showing templates for summary of test results;
- normative Annex I has been added to define declaration codes for marking;
- informative Annex ZA has been revised according to requirements of CPR.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

For relationship with EU Directive 89/106/EEC, see informative Annex ZA, which is an integral part of this document.



## Introduction

This European Standard is designed for use by manufacturers, who are placing their variable message traffic signs on the market, as well as by Road Authorities and private developers who wish to use variable message signs. It provides requirements for performance of characteristics of these signs, test and assessment methods and the means of evaluation of conformity.

This European Standard is a product standard covering the requirements for variable message traffic signs (VMS). A VMS is a sign where the information shown can be changed or switched on or off as required. The information can be text and/or symbols.

VMS fall into the two different types of continuous and discontinuous. Continuous VMS show sign faces of the types of fixed signs defined in EN 12899. Discontinuous VMS use luminous elements to show different messages on a single sign face.

There is diversity of VMS. Some have elements that are placed with a view of displaying a few predetermined messages, while other have elements placed in arrays. Some can show messages where all elements have approximately the same luminous intensity while other can vary the luminous intensity individually. Some can show certain predetermined colours, while other can show a range of colours by means of the RGB technique. Some can show only character legends while other can show a wider range of legends.

This European Standard does not describe the detailed form and configuration of a VMS. Therefore, test modules are used to demonstrate compliance with the requirements of this European Standard because of the impracticality of testing some complete VMS.

Because of the major demands on a sign for good legibility and visibility throughout the required viewing range, the main properties of the sign are described. These properties can vary depending on the situation. For example, it will be not necessary to ask for a minimum temperature requirement of  $-40\text{ }^{\circ}\text{C}$  in Greece, but this needs to be considered in Lapland. For visual performance there will be a difference between installation on highways - with good distance visibility and a narrow beam width - and installation in cities, where there is only short distance legibility and when a wide beam width may be required.

This European Standard uses requirements for performance of the characteristics, which are not dependent on technology. The visual and environmental performance is demonstrated on a test module. This European Standard contains a number of defined requirements, some of which have to be demonstrated on the test module, others that are to be verified by the manufacturer. It is the manufacturer's responsibility to ensure that the VMS is fully represented by the test module.

The performances of the main characteristics of discontinuous VMS are given by classes, which are designed to be selected by choosing a combination of classes dependent on the end-user's requirements. This combination covers not only the regulatory requirements of the destination but also issues of lifetime, quality, maintenance and construction, all of which affect the ability of a sign in its particular application, to meet safety and fitness for purpose. The details in the informative annexes are provided as useful guidance on the additional aspects relating to VMS for those setting up purchasing contracts for signs or signing systems.

Installed discontinuous VMS should be regulated in view of the ambient light and the stroke width of legends to provide the intended apparent luminance and balance of colours. Symbols and fonts for character legends should be designed to provide best possible legibility. Refer to 7.3, 7.4 and Annex B, Annex C and Annex D.

The working environment for VMS can be relatively harsh and equipment that is deemed "fit for purpose" is expected to last in an exposed, corrosive environment for a minimum of 10 years. It is essential that all materials and manufacturing processes take this into account. The manufacturer should detail all steps taken to comply with this.

## 1 Scope

This European Standard provides specifications for the two types of variable message signs (VMS); i.e. continuous (see 3.4) and discontinuous (see 3.6).

This European Standard specifies visual and physical characteristics of VMS as well as their durability aspects. It also provides relevant requirements and corresponding test methods, evaluation of conformity and marking.

This European Standard covers VMS used in circulation areas, on public, private land, including tunnels for the information, guidance, warning and/or direction. Test modules are used to demonstrate compliance with the requirements.

This European Standard does not cover

- a) sign gantries, cantilevers, post (supports) and foundations,
- b) signal heads,
- c) sizes and shapes of VMS messages,
- d) control units and monitoring units unless inside the test module,
- e) sign luminance control.

## 2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

- EN 12899-1:2007, *Fixed, vertical road traffic signs — Part 1: Fixed signs*
- EN 50293:2012, *Road traffic signal systems — Electromagnetic compatibility*
- EN 60068-2-1, *Environmental testing — Part 2-1: Tests — Tests A: cold (IEC 60068-2-1)*
- EN 60068-2-2, *Environmental testing — Part 2-2: Tests — Tests B: dry heat (IEC 60068-2-2)*
- EN 60068-2-5, *Environmental testing — Part 2-5: Tests — Test Sa: Simulated solar radiation at ground level and guidance for solar radiation testing (IEC 60068-2-5)*
- EN 60068-2-14, *Environmental testing — Part 2-14: Tests — Test N: change of temperature (IEC 60068-2-14)*
- EN 60068-2-30, *Environmental testing — Part 2-30: Tests — Test Db: Damp heat, cyclic (12 h + 12 h cycle) (IEC 60068-2-30)*
- EN 60068-2-64, *Environmental testing — Part 2-64: Tests — Test Fh: Vibration, broadband random and guidance (IEC 60068-2-64)*
- EN 60529, *Degrees of protection provided by enclosures (IP Code) (IEC 60529)*
- EN 60598-1, *Luminaries — Part 1: General requirements and tests (IEC 60598-1)*
- EN 60664-1, *Insulation coordination for equipment within low-voltage systems — Part 1: Principles, requirements and tests (IEC 60664-1)*
- EN ISO 9227:2012, *Corrosion tests in artificial atmospheres — Salt spray test (ISO 9227:2012)*

HD 384-4/HD 60364-4 (all parts), *Electrical installation of buildings/Low-voltage electrical installations — Part 4: Protection for safety (IEC 60364-4, all parts)*

HD 638, *Road traffic signal systems*

IEC 60417-1, *Graphical symbols for use on equipment*

ISO 7000:2004, *Graphical symbols for use on equipment — Index and synopsis*

CIE 015-2004, *Colorimetry*

IEC/CIE 17.4-1987, *International lighting vocabulary*

### 3 Terms and definitions

For the purposes of this document, the terms and definitions given in CIE 015-2004 and IEC/CIE 17.4-1987 and the following apply.

NOTE When reading this document for the first time, particular attention regarding terminology should be paid to Annex B.

#### 3.1

##### **AVCP**

assessment and verification of constancy of performance

#### 3.2

##### **backing board**

surround to the VMS, used depending on local circumstances, providing improved visibility of the VMS by means of increasing its size and by providing suitable visible contrast with the VMS background

#### 3.3

##### **cantilever support**

support system with a single post and a cantilever arm supporting VMS(s) mounted over the traffic lane(s)

#### 3.4

##### **continuous VMS**

these are similar to fixed signs according to EN 12899-1, the only difference being that by some electro- and/or mechanical means they can show various messages

EXAMPLE Rotating prism signs, roller blinds, etc.

#### 3.5

##### **control device**

equipment used to execute a change of message other than by purely manual means

#### 3.6

##### **CWFT**

classification without further testing

#### 3.7

##### **discontinuous VMS**

these create messages using discontinuous individual elements that can be in one of two states (or more) and can thereby create various messages on the same sign face, in the following colours: white, yellow, orange, green, red and blue as specified herein

EXAMPLE Fibre optic signs, LED signs, LCD signs, etc.

#### 3.8

##### **display surface**

visible part of a VMS that contains the elements that may be activated to display the message

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**3.9  
element**  
basic visual light emitting and/or reflecting object or cluster of objects in the display surface of a VMS, activated in conjunction with other elements to form the desired message

**3.10  
element spacing**  
centre-centre distance of two elements

**3.11  
equivalent area**  
It is needed for achieving the equivalent appearance of a VMS with a fixed sign according to EN 12899-1

Note 1 to entry: Further explanation is given in Annex A.

**3.12  
front panel**  
visible part of a sign comprising the display surface; and the backing-board when this is integrated in the front of the VMS

**3.13  
front screen**  
screen protecting the display surface or the parts of it against dust, water, etc.

**3.14  
gantry**  
support system spanning a carriageway with one or more posts on each side of the carriageway supporting VMS mounted over the traffic lanes

**3.15  
horizontal reference plane**  
horizontal plane containing the reference axis, when the VMS is positioned in such a way that the reference axis is horizontal

**3.16  
lay-out**  
physical arrangement of characters (text) and symbols, on the display surface

**3.17  
luminance ratio**  
**LR**  
ratio of luminance emitted from the sign in the ON state compared to the luminance in the OFF state.

Note 1 to entry: For calculation refer to 9.5.4.3

**3.18  
matrix**  
grid whose intersections hold the centre of the elements used in a VMS. A matrix may cover the whole display surface or part of it. Axes X and Y of the grid may or may not be orthogonal

**3.18.1  
irregular matrix**  
spacing of intersections on either X or Y or both axes is not constant

**3.18.2  
regular matrix**  
spacing of intersections on the X and Y axes is constant but may be different

**3.19  
manufacturer**  
producer with legal responsibility for placing the product on the market

**3.20****message**

configuration consisting of symbols and/or text

**3.21****reference axis**

axis originating on the reference centre of the test module being perpendicular to the front of it, unless otherwise defined by the manufacturer

**3.22****reference centre**

point on the test module which is designated to be the centre of the test area for specifying its performance and which is defined by the manufacturer

**3.23****supplier**

producer of components (e.g. sign faces, fixing devices, optical devices, luminous sources, etc) for the product

**3.24****support**

structure intended to maintain the VMS in its designed position (poles, posts, fixing, columns, ...)

**3.25****test angles**

horizontal test angle is the angle between the test axis and the vertical reference plane; and the vertical test angle is the angle between the test axis and the horizontal reference plane

Note 1 to entry: When the test axis is lower than the horizontal reference plane the vertical component of the test angle is designated as negative.

Note 2 to entry: When the test axis is to the left of the vertical reference plane as seen from the reference centre the horizontal component is designated as negative.

**3.26****test axis**

line from the reference centre of the test module to the luminance meter head

**3.27****type testing**

complete set of tests and other procedures for which the performances are to be declared for the relevant intended use of VMS

**3.28****variable message traffic sign****VMS**

sign for the purpose of displaying one of a number of messages that may be changed or switched on or off as required

**3.29****vertical reference plane**

vertical plane containing the reference axis

**3.30****VMS background**

part of environmental scenery, which, to the viewer, immediately surrounds the VMS

## 4 Dimensions and tolerances requirements

Dimensions, shape and other physical parameters, character sizes, tolerances and character spacing shall be as required by the purchaser. The dimensions of the characters and symbols shall be defined using equivalent area as detailed in Annex A.

## 5 General design requirement

### 5.1 General

All parts of VMS shall be securely connected to the VMS housing.

NOTE See Annex E (informative): "Specific design issues" gives guidelines.

### 5.2 Dangerous substances

National regulations on dangerous substances may require, verification and declaration on release, and sometimes content, of dangerous substances, when construction products covered by this European Standard are placed on those markets.

In the absence of European harmonised test methods, verification and declaration on release/content should be done taking into account national provisions in the place of use.

NOTE An informative database covering European and national provisions on dangerous substances is available at the [http://ec.europa.eu/enterprise/sectors/construction/cp-ds/index\\_en.htm](http://ec.europa.eu/enterprise/sectors/construction/cp-ds/index_en.htm).

## 6 Visual performance requirements of continuous VMS

### 6.1 General

The visual performance for continuous VMS (see 3.4) shall be in accordance with the relevant visual performance requirements of EN 12899-1 as applicable to the specific class and shall meet the requirements given therein.

NOTE EN 12899-1 deals with retro-reflective signs, non retro-reflective signs, transilluminated signs and externally illuminated signs.

### 6.2 Durability of visual performance

The durability of visual performance for continuous VMS (see 3.4) shall be in accordance with the relevant durability performance requirements of EN 12899-1:2007, 4, 7.2.2.1.4 or 7.3.1.8 as appropriate and shall meet the requirements given therein.

## 7 Visual performance requirements of discontinuous VMS

### 7.1 Classification

The relevant class designations of the visual performance of discontinuous VMS shall be declared prior to testing. These shall be expressed with class designations listed in Table 1.

**Table 1 — Class designation of the visual performance parameters of VMS**

Visual performance parameter	Class designation	Remarks
<b>Colour</b>	C1, C2	C2 is the more restrictive
<b>Luminance (<math>L_a</math>)</b>	L1, L2, L3, L1(*), L2(*), L3(*)	L3 has the highest luminance (* ) for specific situations (see 7.3)
	L1(T), L2(T), L3(T)	These classes are for tunnel use
<b>Luminance ratio (LR)</b>	R1, R2, R3	R3 has the highest luminance ratio
<b>Beam width</b>	B1, B2, B3, B4, B5, B6, B7	B7 has the widest beam

NOTE 1 The purchaser should select the appropriate parameter classes relevant to the application. Care is needed because some class-combinations are not possible and/or not effective.

NOTE 2 Specific design issues are covered in D.3, where guidelines are given on class combinations, and Annex E.

### 7.2 Colour

The colours red, orange, white, green, blue, and yellow are specified herein.

The colour shall be measured in accordance with 9.5.3. The chromaticity co-ordinates of the colours are defined in accordance with the CIE 1931 Standard Colorimetric Observer as referenced in CIE 015-2004.

The chromaticity co-ordinates of the colour class C1 shall conform to Table 2. The chromaticity co-ordinates of the colour class C2 shall conform to Table 3. In Figure 1 these chromaticity areas are plotted in CIE 1931 chromaticity diagram.

The chromaticity areas in Table 2 and Table 3 for colours red, orange, yellow, white, green and blue are as recommended in CIE S004/E-2001 for the colours of signal lights.

NOTE 1 The colour orange should not be used when there is the need to differentiate between yellow and orange or red and orange.

NOTE 2 The use of colour class C2 is recommended when there is a clear need to distinguish between colours.